ASSESSMENT OF THE PROFITABILITY AND MARKET SHARE OF MAIZE VALUE CHAIN IN IMO STATE, NIGERIA

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ABSTRACT

This study evaluated the profitability and market share of maize value chain in Imo State, Nigeria. Results of the analyses shows that seed suppliers, producers, processors and marketers respectively made a net income of N13,364.79, N113,339.38, N505.10 and N12,532.38 per ton. Returns on investment to seed suppliers, producers, processors and marketers respectively were N2.049, N4.87, N0.029 and N0.557. Producers contributed more (1.02%) to the market than any other sector of the chain. This was followed by marketers (0.31%), seed suppliers (0.17%) and processors (0.16%). It was recommended that maize value chain actors should strengthen themselves financially by forming cooperative groups.

KEYWORDS: Profitability, Market Share & Maize Value Chain

INTRODUCTION

Maize (<u>Zea mays</u> L.) is a versatile crop with wide adaptations and large volumes of early maturing varieties. Maize can be grown in a small area, harvested and stored for seasons for multiple uses. In Nigeria, the rate of demand for maize is on the increase due to the fact that the crop can be used both as food for human consumption, feed for animals, and as an industrial raw material (Sadiq, 2014). About 50 species of maize exist with different shapes, colours, textures, and sizes. Cultivated and consumed by most people are the yellow, white and red maize. The grains of this crop are rich in vitamins A, C, E, carbohydrate, essential minerals, dietary fiber and protein and consumed as grain (Mohammad et al., 2014). Maize constitutes the major ingredient of animal feed; ethanol used as bio-fuel and for medical purposes could be produced from maize grains (Monsanto, 2014). The largest maize producer in Africa is Nigeria which ranks the tenth largest producer in the world (International Institute of Tropical Agriculture (IITA), 2012). In Nigeria, maize started as at subsistence level and has gradually risen to be a commercial crop as agro-based industries depend on it for raw material (Iken and Amusa, 2014). Imo State is the fourteenth largest producer of maize in Nigeria (USAID, 2010). Maize is still under small scale production level in Imo state cultivating about 1.5 hectares on average, which is usually scattered over a wide area (Akande, 2009). The smallholder maize farmers in the state can be linked effectively to the markets by improving the activities in the value chain. Value chain is the full range of activities which are required to bring a product or service from conception, through the different phases of production and delivery to final consumers and disposal after use (Kaplinski and Morris, 2003). A value chain is a sequence of related business functions from provision of specific inputs for a particular product to primary production, utility creations and marketing, to the final sale of the product to the consumer (Gesellschaft fur Technische Zus Clmmenarbeit (GTZ) Value Links, 2008)). A set of operators perform the different functions such as producers, processors, traders and distributors of a particular product linked

by a series of business transactions through which the product passes from primary producers to end consumers. These value chain actors who are responsible for transmission of materials, information and/or services, share an interest in the end-product because changes in the end-market affect them collectively and simultaneously. Profitability of maize value chain actors has important implications for developmental strategies in most developing countries due to the dominance of the primary sector. A clear understanding of this profit index can efficiently assist policy formulation for efficacy of present and past reforms. The primary objective is to estimate how profitable the market for maize can be and the share of the value chain actors in Imo State and add to the existing knowledge on maize.

MATERIALS AND METHOD

Imo state is located in the South Eastern geographical area of Nigeria and has a total landmass of 5,430 square kilometers and a population of 4,060,816 people with a population density of 725 persons per square kilometer (National Population Commission, 2020). The state is bounded on the East by Abia state, North by Anambra state, South and South West by Rivers state. It is basically an agrarian state and lies within the tropical rainforest ecological zone. It is located between latitudes $5^040'$ and $8^035'$ north of the equator and longitudes $6^025'$ and $9^040'$ east of the meridian. There are two major climatic seasons, the rainy season and the dry season. The major food crops grown in the state are cassava, maize, yam, cocoyam, melon and different varieties of vegetables. The major economic activities include; farming, trading, food processing, craft making etc. Administratively, Imo state is divided into 27 local government areas and three agricultural zones namely; Owerri, Orlu and Okigwe.

The multistage sampling technique was adopted in selecting the sample for the study. In the first stage, two (2) Local Government Areas were randomly selected from each Agricultural Zone; making a total of six (6) Local Government Areas. In the second stage, two (2) communities were randomly selected from each of the six (6) LGAs to make a total of 12 communities. In the third stage, five (5) villages were randomly selected from each of the 12 communities earlier selected to give a total of 60 villages used for this study. In the fourth stage, a total of 674 active maize farmers were compiled with the help of extension agents and community leaders which served as sampling frame for the study. Yamane (1967), formula was adopted to determine the size of sample for the study. The formula is specified as follows:

$$n = \frac{N}{1+N(e)^2} \text{ eq.} \hspace{4cm} 1$$

Where

n = sample size

N = population of study

e = allowable error

$$n = \frac{674}{1+674(0.05)^2} \text{ eq.} \hspace{4cm} 2$$

$$n = 251$$

In the fifth stage, the sample was divided into 4 strata or chain actors which are seed suppliers, producers, processors and marketers. In the sixth stage, equal samples were drawn from each stratum since no significant difference

was found in the number of actors in each stratum and to enable effective and efficient comparison. A total of 240 maize value chain actors comprising of 60 suppliers, 60 producers, 60 processors and 60 marketers were used for further analysis.

Method of Data Collection

Primary and secondary data were used to collect information on socio-economic characteristics of the respondents, net farm income and contributions of maize value chain actors to the market using well-structured questionnaire. In all, 240 respondents in the state were interviewed.

Method of Data Analyses

Descriptive and inferential statistical tools such as mean, percentage, frequency distribution, and net income model and market share index were used for analysis. The net income model is expressed as:

$NI_i = TR-TC$ eq.   3

$TC_i = TVC + TFC$ eq.   4

Where,

NI = Net income (₦/ton)

TR = Total revenue/Sales (₦/ton)

TVC = Total variable costs (₦/ton)

TFC = Total fixed costs (₦/ton)

Market share index is given as follows:

$$Market\ Share_i = \frac{Average\ profit\ per\ ton}{total\ profit\ per\ ton} X\ 100\%\ eq.$$ 5

RESULTS AND DISCUSSION

Characteristics of the Respondents

Socio-economic characteristics of the respondents as presented in Table 1.

Table 1: Distribution of Respondents by Socio-Economic Characteristics

Variables	Suppliers	Producers	Processors	Marketers
Gender	**%**	**%**	**%**	**%**
Male	46.67	46.67	21.67	55
Female	53.33	53.33	78.33	45
Age				
15-29	-	1.67	18.33	13.33
30-44	-	20	38.33	28.33
45-59	65	65	41.67	46.67
60-74	35	13.33	1.67	11.67
Mean	**57.25**	**50.5**	**41**	**45.5**
Household size				
1-3	25	21.67	48.33	45
4-6	55	70	48.33	51.67
7-9	20	8.33	3.33	3.33
Mean	5	7	4	4
Educational level				

No education	-	-	6.67	-
1-6	25	38.33	10	1.67
7-12	48.33	30	56.67	53.33
13-18	26.67	31.67	26.67	45
Mean	**9.6**	**9.1**	**9.9**	**12.1**
Experience				
1-10	61.67	40	66.67	50
11-20	38.33	30	33.33	35
21-30	-	20	-	15
31-40	-	6.67	-	-
41-50	-	3.33	-	-
Mean	**9.3**	**15.8**	**8.8**	**12**
n	**60**	**60**	**60**	**60**
Source: Field Survey, 2019				

Table 1 shows that majority (53.33%, 53.33% and 78.33%) of the respondents were female suppliers, producers and processors of maize respectively. This suggests that maize farming is believed to be a less strenuous activity for females in the study area. The result is in line with the findings of Eboiyehi (2006), Fodor (2006) and Joda (2010), Muhammed-Lawal *et al*. (2013) who observed that supplies, production and processing of maize are predominantly female activities. Similarly, majority (55%) of the respondents were male marketers of maize. This is due to the strenuous nature of marketing especially travelling to a long distance which imposes a lot of marketing risks and this deter females from participating in maize marketing. This is in line with the research findings of Ogunniyi and Omotesho (2011) who reported that male are involved mainly with the marketing of maize.

Further analysis show that (65%, 65%, 41.65% and 46.67%) of the respondents age were consistent within 45 and 59 years for suppliers, producers, processors and marketers of maize respectively. Their mean ages were 57.25, 50.5, 41 and 45.5 years respectively. This implies that respondents were active, productive and willing to engage in various economic activities for enhancement of income. It indicates increase productivity because age is positively related to adoption of innovations. This concurs to the findings of Amao *et al*. (2007); Obasi *et al*. (2012; 2015) and Oluwasola (2010) who observed that younger people are dynamic with regards to adoption of innovations.

Furthermore, (55%, 70%, 48.33% and 51.67%) of maize seed suppliers, producers, processors and marketers had household size within 4-6 persons, while 25%, 21.67%, 48.33% and 45% had household size within 1-3 persons. Furthermore, 20%, 8.33%, 3.33% and 3.33% had household size within 7-9 persons respectively. The mean size of the household were 5, 7, 4 and 4 persons for maize seed suppliers, producers, processors and marketers respectively. This is in line with the reports of National Population Commission (NPC) and Inner City Fund (ICF) (2014), which established that the average size of a household in Nigeria is 5 persons. According to Abdeleteif and Siegfried (2013) when the household is large, there is greater tendency of greater use of family labour.

With regard to educational attainment, (48.33%, 30%, 56.67% and 53.33%) of maize seed suppliers, producers, processors and marketers had secondary education, 25%, 38.33%, 10% and 1.67% had primary education, 26.67%, 31.67%, 26.67% while 45% had tertiary education respectively. Only 6.67% of maize producers had no formal education. The average numbers of years in school were 9.6, 9.1, 9.9 and 12.1 respectively. This shows that most of the respondents could read and write thus had the advantage of adopting innovation, since education correlates positively with adoption of improved agricultural technologies. Educational status relates to exposure to new ideas, managerial capacity and

technological knowhow to adopt and integrate innovations into the household's survival strategies. According to Ajao *et al*. (2012) the educated farmers utilize agricultural innovations more. Similarly, majority (61.67%, 40%, 66.67% and 50%) of maize seed suppliers, producers, processors, and marketers respectively had between 1-10 years of experience. About 38.33%, 30%, 33.33% and 35% had 11-20 years of experience in their respective business. However, 20% and 15% of maize producers and marketers had 21-30 years of experience, 6.67% of maize producers had 31- 40 years of experience while 3.33% of the producers had 41-50 years of experience. The mean years of experience were 9.3, 15.8, 8.8 and 12. Lengthy years of experience are an important requirement for the success of any business (Amao *et al*., 2007). Findings of the study agrees with Dauda and Ndanitsa (2009) who observed that the years of experience determines performance and make better managers to overcome administrative bottlenecks.

Net Margin and Profitability of Maize Value Chain Actors

The cost and returns items of maize seed suppliers, producers, processors and marketers are presented in Table 2 from which the net margin and profitability of the value chain actors were estimated.

Table 2: Costs and Returns per ton of maize value chain actors

Variables	Suppliers	Producers	Processors	Marketers
Return	po	138,521	18,222.2	34,634.83
Depreciation	3,350.82	1,889	3,885.57	1,778.85
Total fixed cost	3350.82	1,889	3885.57	1,778.85
Product cost	400	2,755.52	8,825.42	18,495
Preservation cost	1,349.02	-	-	-
Market levy	186.67	-	-	285.09
Charcoal	-	-	2,658.33	-
Labour	-	7,610	133.33	-
Fertilizer	-	5,461.67	-	-
Pesticides	-	3,501.58	-	-
Fuel	-	-	584.17	-
Transportation	640	1,072.42	902.54	1,087.07
Packaging material	595.37	2,891.43	727.74	456.44
Total variable cost	3,171.06	23,292.62	13,831.53	20.323.60
Total cost	6,521.88	25,181.62	17,717.10	22,102.45
Gross Income	16,715.61	115,228.38	4,390.67	14,311.23
Net Income	13,364.79	113,339.38	505.10	12,311.23
Profitability index	2.049	4.87	0.029	0.557
Source: Field survey, 2019				

The results in Table 2 show that the total revenue realized by maize seed suppliers, producers, processors and marketers respectively were ₦19,886.67, ₦138,521, ₦18,222.2 and ₦34,634.83 per ton with a total variable cost of ₦3,171.06, ₦23,292.62, ₦13,831.53 and ₦20,323.60 respectively and a total fixed cost of ₦3,350.82, ₦1,889, ₦3,885.57 and ₦1,778.85 respectively. The maize actors made a net income of ₦13,364.79, ₦113,339.38, ₦505.10 and ₦12,532.38, which shows positive return to investment. With regard to profitability of the enterprise by the actors; 2.049, 4.87, 0.029 and 0.557 were estimated indicating that every ₦1 invested yielded ₦2.049, ₦4.87, ₦0.029 and ₦0.557 to maize seed suppliers, producers, processors and marketers respectively. This implies that maize seed supply and production are profitable while processing and marketing are not profitable. The profitability index measures success of the maize value chain. A ratio greater than one is preferred for any enterprise because the higher the ratio, the greater the profit (Olukosi and Isitor, 2008).

Maize Market Share

The contributions of maize seed suppliers, producers, processors and marketers to the market are presented in Table 3.

Table 3: Maize Market Share Contribution by Actors

Variables	Suppliers	Producers	Processors	Marketers
Total return per ton	112,051,720	112,051,720	112,051,720	112,051,720
Average return per ton	198,866.7	1,140,092	182,222	346,348.3
Market share (%)	0.17	1.02	0.16	0.31
Source: Field survey, 2019				

Market share contributions of the major actors of the maize value chain are shown in Table 3. The findings show that producers contributed more (1.02%) to the market than any other sector of the value chain. This was followed by marketers (0.31%), seed suppliers (0.17%) and least by processors (0.16%). This implies that the various actors can choose to divert to maize production or complement their activity with another to increase income. A large market share makes for price leadership in the market and this situation arises when the enterprise is the low-cost leader in the sector (Bragg, 2020).

CONCLUSIONS

From the findings of this study, we conclude that the various participants in the value chain of maize made significant profit from their investment and the producers contributed more to the market than any other sector of the value chain.

RECOMMENDATIONS

- There is need to expand substantially the domestic supply of technologically improved farm inputs such as fertilizers, seeds, agro-chemicals, and irrigation pumps through public/private sector partnership to achieve the desired growth in the various enterprises.

- Maize producers need access to more land for production as this will increase output and ensure a steady supply of the raw materials and the final product to the market.

- Maize value chain actors should form cooperative groups to grant them access to government bank loans at very low interest rates.

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